

## Transcontinental Observations Into the Chemistry of the Atmosphere (TROICA): Main Results and Prospects

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A train-based laboratory designed for mobile observations of atmospheric chemical composition and environmental pollution has been constructed and equipped in Moscow, Russia. The laboratory consists of two specialized carriages that can be coupled to trains operating along electrified railroads of Russia and other European and Asian countries (Figure 1), adhering to the requirements outlined by the WMO Global Atmospheric Watch program. The principal goals of this laboratory are as follows: monitoring of the chemical composition of the atmosphere in large regions, studying radiative and thermodynamic atmospheric parameters over the Eurasian continent, revealing anthropogenic and natural sources of pollutants along the rail corridors, calibration of the ground-based networks, validation of satellite observations, and detection of natural and human-induced extreme events.

During 1995-2002 a prototype of the laboratory was used to monitor ozone, greenhouse gases, chemically active gases, and aerosols along the Trans-Siberian and the meridional Murmansk-Kislovodsk railroads. These experiments were managed by the A.M. Obukhov Institute of Atmospheric Physics and the Max Planck Institute for Chemistry. In 2001 CMDL joined as a collaborator. A large body of important information was obtained regarding the distribution of ozone, nitrogen oxides, and ozone precursors over the continent, the aerosol and gas emissions from different sources, and the effects of transboundary transport on atmospheric pollution of the atmosphere over Russia. The mobile laboratory has the capacity to be an important component of the Russian Atmospheric Watch system that should be developed in the near future. This presentation will report on the main technical features of the new and improved mobile platform. The results of quality data investigations and the validation of ground-based and satellite observations will be discussed. In the future the laboratory will also be used for the ecological education of students and non-scientists.

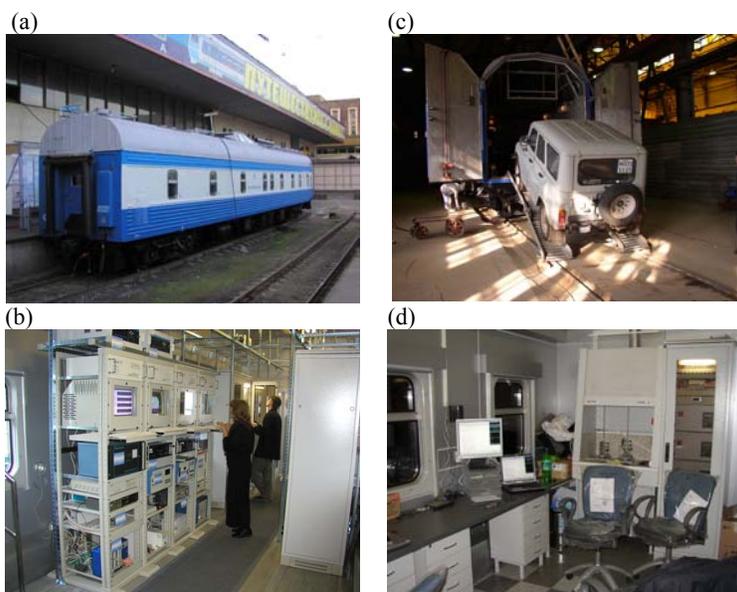


Figure 1. (a, b) External and internal views of the laboratory carriage for continuous measurements; (c, d) carriage for chemical analysis of samples of air, aerosol, water, soil and vegetation. (c) The special automobile that rides in the carriage is used for regional observations and taking samples.